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B(E1) distributions from Coulomb-dominated break-up cross sections with XCDCC

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Halo nuclei have been a prolific field of Nuclear Physics since its discovery together with the dawn of radioactive beam facilities. The halo is formed by one or two weakly bound nucleons, usually neutrons, orbiting around the rest of nucleons that conforms a compact core. In the case of neutron halo, all the charge is inside core, and, so, a cornerstone in the study of neutron halo is the Dipole Electric Transition Probability, B(E1).

Such B(E1) distribution is usually obtained by performing Coulomb-dominated break-up reactions assuming that, under certain conditions, break-up is only due to dipole Coulomb excitation. Being also 11Be one of the most explored one-neutron halo and usually a benchmark for different models and theories, it is remarkable the fact that two different sets of 11Be on 208Pb data [1,2] led to apparently incompatible B(E1) distributions.

In this contribution we will show how an extension of the Continuum-Discretaized Coupled-Channels method, capable to introduce core excitations (XCDCC) can be used to study Coulomb break-up in order to extract the B(E1). We will discuss a recently proposed procedure which has been able to obtain compatible B(E1) from both data, giving an end to this long-standing discrepancy [3]. Finally, we will apply the same procedure to other cases of interest such us 15C and 19C.

[1] N. Fukuda, et al., Phys. Rev. C 70, 054606 (2004)
[2] R. Palit, et al., Phys. Rev. C 68, 034318 (2003)
[3] A.M.Moro, J.A.Lay, and J.Gómez Camacho, Phys. Lett. B 811, 135959 (2020)

Collaboration

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